

OCEAN GALES AND STORMS, NOVEMBER 1933—Continued

Vessel	Voyage		Position at time of lowest barometer		Gale began	Time of lowest barometer	Gale ended	Lowest barometer	Direction of wind when gale began	Direction and force of wind at time of lowest barometer	Direction of wind when gale ended	Direction and highest force of wind	Shifts of wind near time of lowest barometer
	From—	To—	Latitude	Longitude									
Ward, Am.M.S.	Shanghai	Los Angeles	39 24 N.	171 26 E.	Nov. 13	Mdt., 13	Nov. 13	29.39	SE	W., 5	SW	S., 8	None.
Empress of Asia, Br.S.S.	Vancouver	Yokohama	51 48 N.	151 12 W.	Nov. 14	6a., 14	Nov. 14	28.98	N	N., 9	NNW	N., 9	N.-NNW.
President Jackson, Am.S.S.	Victoria	do	52 03 N.	149 16 W.	do	8a., 14	do	28.80	NW	ESE., 3	WNW	NW., 9	SE-ESE-NW.
Illinois, Am.S.S.	Niigata, Japan	San Francisco	47 15 N.	169 12 W.	Nov. 13	1p., 14	Nov. 15	28.78	ESE	NE., 11	NNW	NE., 11	ENE-NE-NNE.
Empress of Asia, Br.S.S.	Vancouver	Yokohama	52 00 N.	162 06 W.	Nov. 15	6a., 15	do	29.06	NE	NE., 8	NE	NE., 9	Steady.
President Jackson, Am.S.S.	Victoria	do	52 02 N.	160 45 W.	do	Noon, 15	do	28.78	NNE	NE., 8	N	NNE., 9	NE-NNE.
Oregonian, Am.S.S.	Balboa	Los Angeles	15 04 N.	94 27 W.	Nov. 16	4p., 16	Nov. 16	29.92	NNW	N., 9	N	N., 9	SE-NW.
Grays Harbor, Am.S.S.	Seattle	Yokohama	39 18 N.	144 00 E.	do	10p., 16	Nov. 17	29.16	SE	SE., 8	WSW	NW., 11	None.
Ward, Am.M.S.	Shanghai	Los Angeles	41 44 N.	158 35 W.	Nov. 17	4p., 17	Nov. 18	29.66	W	W., 7	W	W., 8	ENE-SSW.
Hiye Maru, Jap.S.S.	Yokohama	Vancouver	46 09 N.	165 00 E.	Nov. 18	11a., 18	do	28.19	ESE	SSW., 7	SSW	SSW., 11	E-NE.
Empress of Asia, Br.S.S.	Vancouver	Yokohama	48 54 N.	167 18 E.	do	10p., 18	Nov. 19	28.70	E	E., 8	NW	E., 9	E-Var-N.
President Jackson, Am.S.S.	Victoria	do	49 04 N.	171 32 E.	do	4a., 19	Nov. 20	28.65	ESE	Var. 1	NNW	NNW., 10	E-ESE.
President Grant, Am.S.S.	Yokohama	Seattle	37 45 N.	145 35 E.	Nov. 19	3p., 19	do	29.74	SE	E., 8	NE	E., 9	E-ESE.
Hiye Maru, Jap.S.S.	do	Vancouver	50 03 N.	153 45 W.	Nov. 22	11a., 22	Nov. 23	28.35	N	N., 4	SSW	WSW., 11	NNE-N-W.
Tamaha, Br.S.S.	Shanghai	Los Angeles	40 03 N.	171 09 E.	Nov. 24	2a., 25	Nov. 25	29.97	S	S., 8	S	S., 9	S-SW.
Taiyo Maru, Jap.S.S.	Yokohama	Honolulu	34 46 N.	152 48 E.	Nov. 26	2p., 25	Nov. 28	29.76	N	NE., 6	ENE	N., 8	Steady.
R. J. Hanna, Am.S.S.	Richmond, Calif.	Point Wells	38 52 N.	123 55 W.	Nov. 28	2p., 28	Nov. 29	29.88	NW	NW., 6	NNW	NNW., 10	Steady.
Tamaha, Br.S.S.	Shanghai	Los Angeles	40 01 N.	167 42 W.	do	4p., 28	do	30.22	NNE	ENE., 8	NE	ENE., 8	NE-ENE.
San Diego Maru, Jap.S.S.	Kobe	San Francisco	40 20 N.	162 45 E.	Nov. 29	6p., 29	do	29.27	SSE	SSE., 10	SW	SSE., 10	SSE-SW.

¹ Position approximate.

NORTH PACIFIC OCEAN, NOVEMBER 1933

By WILLIS E. HURD

Atmospheric pressure.—Winter conditions of atmospheric pressure were fairly well established over the North Pacific Ocean during November 1933. The Aleutian low on the average was central over the western part of the Gulf of Alaska (average pressure at Kodiak, 29.59 inches). Pressures were above normal along the entire American coast, with the point of greatest departure, +.27 inch, at Tatoosh Island, and that of least departure, +.03 at Kodiak. Pressures were slightly lower than normal from the Hawaiian Islands westward to the Philippines.

The North Pacific anticyclone was much disturbed by lows, except off the middle American coast, where it remained unbroken throughout the month. High pressures intruded strongly into the Aleutian area on several days early and late in the month. The highest daily reading was 30.76 inches, reported by a ship in the western Aleutians on the 29th.

TABLE 1.—Averages, departures, and extremes of atmospheric pressure at sea level, North Pacific Ocean, November 1933, at selected stations

Stations	Average pressure	Departure from normal	Highest	Date	Lowest	Date
	Inches	Inch	Inches		Inches	
Point Barrow ¹	30.12	+0.13	30.42	7.8	29.68	12
Dutch Harbor	29.70	+ .11	30.48	30	29.00	27
St. Paul	29.70	+ .11	30.56	29, 30	28.96	27
Kodiak	29.59	+ .03	30.36	5	28.60	23
Juneau	29.89	+ .13	30.47	4	29.24	20
Tatoosh Island	30.24	+ .27	30.58	12	29.74	27
San Francisco	30.13	+ .04	30.32	12	29.71	28
Mazatlan	29.94	+ .05	30.02	17	29.84	3
Honolulu	30.00	— .02	30.15	15	29.79	8
Midway Island	30.04	— .04	30.30	4	29.74	30
Guam	29.84	— .02	29.96	19	29.76	11
Manila	29.83	— .06	29.92	16	29.64	2
Naha	30.03	+ .05	30.20	6	29.61	1
Chichishima	30.00	+ .02	30.20	9	29.60	15
Nemuro	29.99	— .01	30.42	10	29.30	16

¹ For 20 days.

NOTE.—Data based on 1 daily observation only, except those for Juneau, Tatoosh Island, San Francisco, and Honolulu, which are based on 2 observations. Departures are computed from best available normals related to time of observation.

Cyclones and gales.—Storm conditions showed considerable increase in intensity this month over those in October, especially along the northern steamship routes, and in the southeastern tropics. At least 27 days in November had wind forces of 8 or over, and of these, at least 10 days had wind forces of 10 or 11 in some part of the ocean.

The gales of the 1st to 4th occurred principally in northern waters south of the Aleutians. On the 6th and 7th the gale field lay east of northern Japan and south of the Kuril Islands. This storm area moved eastward as far as the one hundred and eightieth meridian, south of the western Aleutians, on the 8th and 9th.

The principal cyclone of the month originated as a typhoon between the Philippines and Guam about the 10th, and on this and the two succeeding days gales of force 8-9 were reported near 20° N., between 130° and 140° E. On the 11th, in 20° N., 135½° E., the lowest reported pressure was 29.19 inches. This cyclone passed near the Ogasawara Islands (Chichishima) on the 15th, and on the 16th was causing gales up to 11 in force off the east coast of central Japan. It crossed the Kurils, then swung eastward, and entered the extreme western Aleutian area where, on the 18th, the Japanese S.S. *Hiye Maru*, reported the lowest pressure reading of the month, 28.19 inches, in 46° N., 165° E., with maximum wind force, 11. The disturbance advanced rapidly into west longitudes during the 18th and 19th, and for 4 days remained central as a deep storm near 50° N., 160° to 150° W. The S.S. *Hiye Maru* was again heavily involved in it on the 22d, when the wind rose to force 11, with lowest pressure 28.35 inches, in 50° N., 154° W. On the 23d it weakened and moved northward, entering Alaska north of Kodiak.

From the 23d to 29th scattered gales occurred in northern waters, the most important of which, from the standpoint of shipping, swept the upper California coast on the 28th, with a maximum wind force of 10 reported.

Tehuantepecers.—With the appearance over the United States of extensive winter-type anticyclones that carried a far-reaching southward influence, northerners were experienced in the Gulf of Tehuantepec, as follows: Of force

7 on the 15th and 25th; of force 8 on the 10th; and of force 9 on the 11th and 16th.

Fog.—Only 1 day with fog was reported over the ocean west of 145° W. Thence eastward to the one hundred and thirtieth meridian, north of the thirty-fifth parallel, it occurred on 1 to 3 days. Fog was observed on 4 days between the mouth of the Columbia River and Puget Sound; on about 16 days off the California coast; and on 4 days off the coast of Lower California.

TYPHOONS IN THE FAR EAST DURING NOVEMBER 1933

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Before describing the typhoons which traversed the Philippines during November, an additional remark must be made about the last typhoon for October.

(4) *October 26.*—After passing through the islands near the tenth degree of latitude, the typhoon crossed the China Sea in a northwest direction, and on November 1 struck Quinhon in Indo-China with great violence, causing at least 100 deaths in that locality. It is very instructive to note the rapid growth of this typhoon just in crossing the China Sea, a stretch of not more than 600 miles. Nowhere in the Philippines was a barometric pressure recorded less than 745 mm, and the wind forces were comparatively mild, yet Quinhon recorded a well-authenticated minimum of 708 mm with very destructive winds; in fact the storm had developed into the worst Indo-China experienced for at least 11 years.

(1) *November 1.*—To avoid confusion, this typhoon is designated as that of November 1, although really discovered on October 30, southeast of Yap, on the tropical front. It traveled with irregular speed in a northwest direction, until it reached the China Sea; then it recurved and dissipated near Hainan upon meeting the barrier of the Asiatic high pressure area. Like the previous typhoon it moved very quickly during the night when just east of the islands, after remaining almost stationary during the day. Thus it barely gave us time

to give proper warning to the more easterly cities affected. It was very fortunate that it had not yet developed fully, for it passed within 20 to 30 miles of 4 important places, Surigao, Cebu, Iloilo, and Culion (famous leper colony). Probably 10 lives were lost all told, and the property damage was comparatively slight. A study may be made later as to the possibility of fronts close to the center of the typhoon, but success will be hampered by the interference with free wind circulation by the topography. Before breaking up, the typhoon must have increased in violence while near Hainan, since Fort Bayard (on south China Coast, north of Hainan), though fully 100 miles away from the center, reported the uprooting of trees.

(2) *November 18.*—This depression, for it was only such and not truly a typhoon, arose near Palau, and after slowly moving north-northwest until latitude 12°, turned westward in passing through the islands, and then dissipated in the China Sea. It was apparently little more than a wave on the tropical front, one of the last feeble attempts of the southwest monsoon as the latter was being pushed back toward the Equator. The air streams could be quite satisfactorily traced in the islands during the passage. No strong winds were experienced.

(3) *November 20.*—Starting below Yap this storm traveled along the tropical front in a northwest direction until it passed through the islands. It then turned westward and dissipated in the middle of the China Sea. This storm well illustrates the danger of coming to conclusions too quickly. During its passage through the islands, not one of our stations reported a barometer less than 752 mm, and winds were weak. There were no indications of a typhoon center, only those of a depression. However, the following day, Baler (some 80 miles north-east of Manila, on east coast) which had not sent observations for a few days due to radio trouble, reported that it had had a minimum of 745 mm, maximum wind force 8! There really had been a true typhoon, but with a very small center. The coastal range of mountains had been sufficient to break this up, for no other station of ours reported similar conditions to Baler.